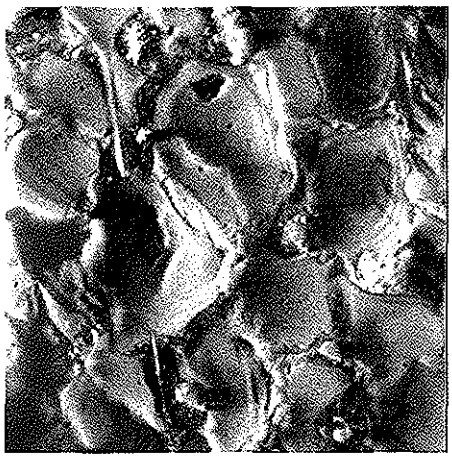

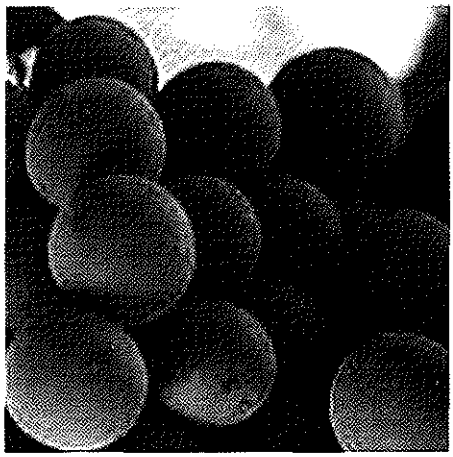

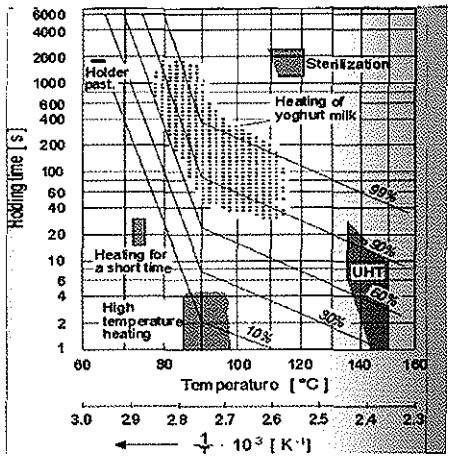

TENTH INTERNATIONAL CONGRESS ON ENGINEERING AND FOOD

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PROGRAM BOOK AND ABSTRACTS

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Rotational speeds increased with increasing viscosity of the containing liquid. Furthermore once solid fraction reached 40% the rotation of cubes resembled to solid body rotation. When a Newtonian fluid (viscosity 0.1 Pas) maximum rotational was observed for solid fraction of 20%, indicating that rotation is a complex phenomenon involving drag and buoyancy forces. In this work MuPEPT was developed and validated for studies of the rotational motion of solid particles. The technique was then applied to study rotating motion of solid particles in cans. It was possible to reconstruct cube rotation and decipher some of the mechanisms involved in solid particle rotation.

J27
IMPACT OF DEEP-FAT-FRYING ON SOME PLANTAIN MICRONUTRIENTS

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Plantains and bananas are one of the major staple foods of sub-Saharan Africa and Latin-America. These fruit are source of dietary minerals and vitamins. Deep-fat frying unit operation is widely used for the transformation of plantain in Latin-America and in Africa. The aim of this research was to evaluate the influence of deep-fat frying on the micronutrients of plantain (*Musa* AAB «barraganete»). Influence of the raw material (two batches) was analyzed. Cylinders (diameter 30 mm, thickness 10 mm) of plantain were fried at four thermal treatments (120–180°C and from 24 to 4 min). Molecules of nutritional interest with water soluble properties (potassium, L-ascorbic acid) or lipid soluble properties (α-carotene, β-carotene) were quantified during the course of frying. One plantain batch was initially rich in L-ascorbic acid (24.4 ± 0.9 mg/100mg) and poor in total carotenoid (0.6 ± 0.3 mg/100mg), while the other was poor in L-ascorbic acid (7.5 ± 0.3 mg/100mg) and rich in total carotenoid (2.1 ± 0.7 mg/100mg). On line measurements of the water content and internal temperature profile allow to characterize the behaviour of both products during deep-fat frying. The thermal study used the cook value as indicators of the effect of thermal history on quality. Potassium was determinate by ICP; L-ascorbic acid and carotenoid determinations were performed by HPLC. Deep-fat frying had no significant effect on potassium contents at any frying conditions. Exclusively with the plantain initially rich in L-ascorbic acid, α-carotene and β-carotene, significant losses were observed. The average loss on L-ascorbic acid, α-carotene and β-carotene were close to 75%, 44% and 35%, respectively. Cook values were very different at any frying conditions, while the losses of micronutrient were not significantly different at the four frying treatments. Cook value parameters does not seem relevant. These couldn't be explained just with a first order kinetic thermal degradation behaviour. Perhaps, the heterogeneous distribution of micronutrient across the plantain (in radial direction) and/or cellular scale could explain of such behaviours. However it's difficult to develop more extensive assumptions without histological information of the micronutrient localization in plantain.

J28
MICROWAVE BLANCHING OF A FRUIT WITH A HIGH-BROWNING POTENTIAL

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Fruits that darken when cut or brushed present a problem for the industry of food service, as well as for food processing and technology. To prevent the enzymatic browning, the blanching of vegetables with water or steam are widely used, however, this may lead to vitamin losses. The use of microwaves for food blanching is attractive due to its origin within the material and fast temperature rise.
The objective of this work was to investigate the conditions to obtain products "sous vide alike" of a high browning potential fruit: hawthorn (*Crataegus mexicana* Moc. & Sessé) employing microwaves and other techniques.
The experimental design included: 1) samples processed with microwaves, 2) fruits processed with a hot break equipment, 3) fruits added with sodium preservatives, and 4) fruits processed in hot water. All the samples were blended and packaged under vacuum in polyethylene bags and stored at refrigeration (5°C). The hawthorn purées were monitored for color, microbiological quality, sensorial analysis and vitamin C content. Microbiological analyses included mesophilics, molds and yeasts.
Experimental conditions to inactivate polyphenoloxidase in hawthorn were obtained mixing the purée of each sample with catechol and evaluating light reflectance. Sodium erythorbate was selected from seven antibrowning compounds, as being the most effective inhibitor of enzymatic browning in hawthorn purées.
Results showed that combination of hurdles (pH, blanching or preservatives, vacuum packaging, refrigeration) used in this work were enough to preserve purées from microbial growth. From the sensorial point of view, microwaved and hot break samples showed better results than purées preserved with additives and processed with hot water. Also, microwaved and hot break samples retained more vitamin C than the fruits blanched in hot water. This may be explained by the losses of water soluble vitamins in this type of processes. Polyphenoloxidase inactivation is achieved with temperatures above 80°C. The intensity of the microwave energy necessary to blanch hawtorn was 0.47 kJ/g.

J29
LOW TEMPERATURE COOKING AFFECTING MEAT QUALITY

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Cooking represents an important step in meat preparation for sensorial and safety aspects. Process conditions applied during cooking are generally chosen to induce the quality changes determining consumer acceptability (i.e. colour, flavour, texture). In recent time increasing is the interest for the so called "slow cooking" or "low temperature" in meat cooking due to the peculiar effects on the quality of the final product in terms of sensory properties and, in particular, on colour and tenderness.
Aim of this study was to validate low temperature cooking conditions used for catering purposes by the evaluation of the effects on culinary quality as well as safety of one-piece meat of different type (beef, pork). Moisture, colour, tenderness were evaluated at different steps of the cooking cycles. To better understand the effects of the cooking conditions on the textural properties of meat, protein degradation was also investigated by electrophoresis analysis. In relation to the temperatures reached by the product during low temperature cooking (< 60°C for bovine and pork meat) and the length of the cooking cycle (also higher than 12 hours), microbial analysis were also carried out.
Results evidenced that low cooking conditions lead to a cooked meat with higher moisture, better colour and higher tenderness. The latter result could be correlated to the increased denaturation of proteins such as myosin and actin and muscle fibre like collagen than the product undergone traditional cooking. Moreover, these effects were more evident in the case of bovine meat than pork meat likely due to a different protein quality.
Cooking conditions, even in low temperature cycles, were able to reduce microbial counts of raw meat to safe levels.
Results are of interesting for the impact on the culinary quality of foods in the catering field.